WATER QUALITY OF SELECTED RESERVOIRS IN SOUTHWESTERN SASKATCHEWAN

G.A. Weiterman
Irrigation Branch, Saskatchewan Agriculture
Outlook, Saskatchewan

Water in both surplus and deficiency causes innumerable problems for Saskatchewan. In this paper I wish to discuss the findings of two years of monitoring of a number of surface water bodies used largely for irrigation in southwestern Saskatchewan. Most of us are concerned only with water quantity. Little thought is given to water quality. We simply turn on the tap and take what's there. Having been raised in southern Saskatchewan the purgative effects of local drinking water supplies did not go unnoticed. The same type of digestive upset which occurs to us can occur in our soils if water quality does not meet certain standards (Cameron & Weiterman, 1986). Spring runoff water has always been assumed to be of suitable quality.

Due to the Individual Irrigation Assistance program which includes redevelopment of existing irrigation lands, the need for water quality data on a large number of water supplies in southwestern Saskatchewan was identified. Part of the requirement of this program is the issuance of a soil water certificate. Water quality information is required for the completion of this documentation.

After realizing the limited amounts of data available through 1984 and the winter of 1985 a scheduled program of collection of

RESERVOIRS (CUBIC DECAMETRES)

1 Junction Reservoir (10 850)
2 McDougald Reservoir (860)
3 Harris Reservoir (6 040)
4 Downie Lake Reservoir (12 210)
5 Adams Lake Reservoir (860)
6 Middle Creek Reservoir (16 280)
7 Altawan Reservoir (6 910)
8 Nashlyn Reservoir (620)
9 Cypress Lake Reservoir (128 650)
10 Eastend Reservoir (2 470)
11 West Val Marie Reservoir (4 190)
12 Val Marie Reservoir (11 590)
13 Summercove Reservoir (1 850)
14 Thomson Lake Reservoir (37 000)
15 Semereau Reservoir (310)
16 Admiral Reservoir (1 110)
17 Cadillac Reservoir (2 220)
18 Gouverneur Reservoir (7 770)
19 Russell Creek Reservoir (1 850)
20 Braddock Reservoir (1 480)
21 Lac Pelletier Reservoir (16 040)
22 Duncairn Reservoir (102 380)
23 Highfield Reservoir (14 930)
24 Shaheen Reservoir (370)
25 Sauder Reservoir (250)
26 Herbert Reservoir (2 960)

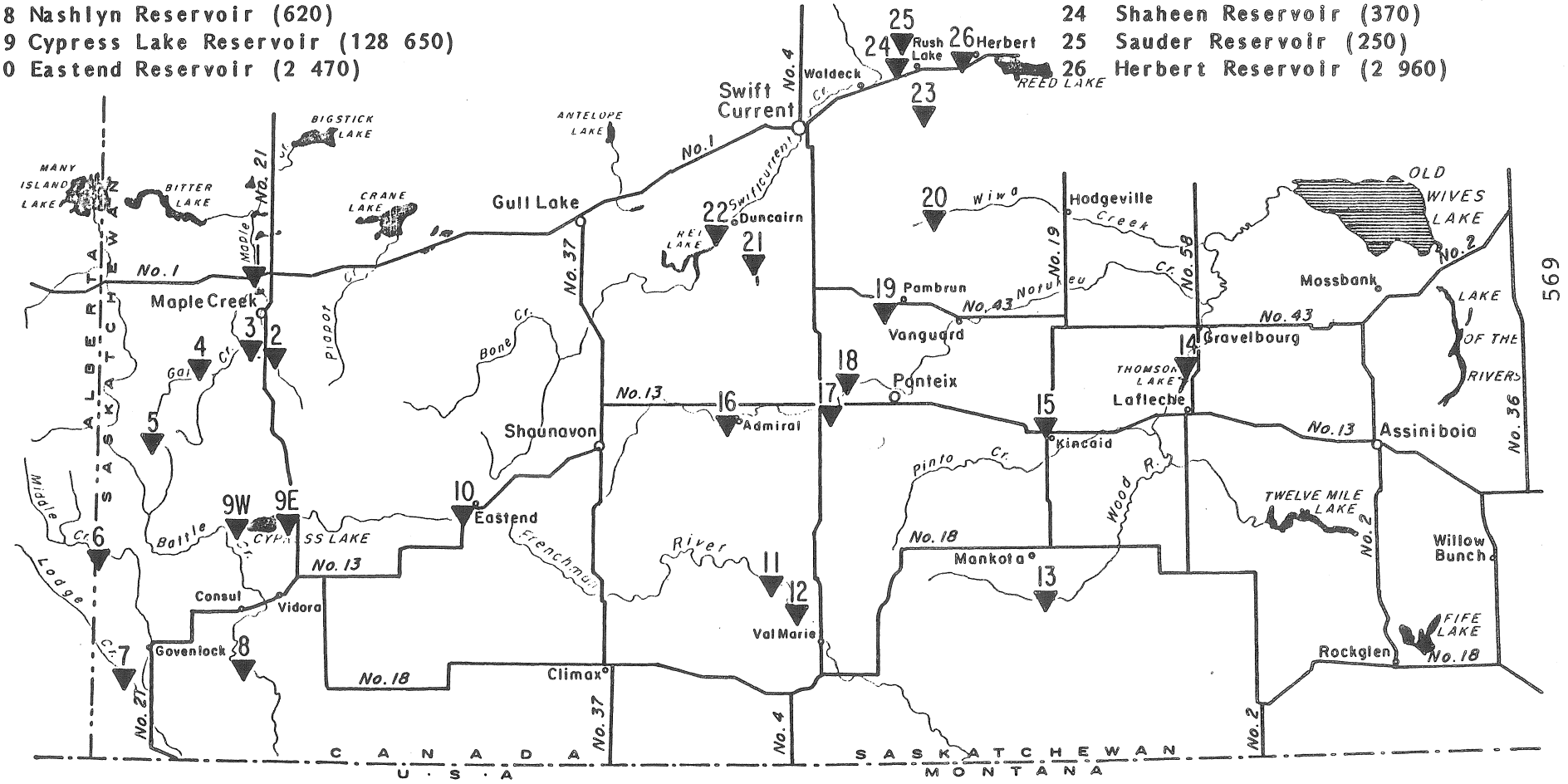

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FIGURE 1 **Saskatchewan — PFRA Storage Reservoirs, the Southwest**

numerous reservoirs was initiated in the spring of 1985. Unfortunately, 1985 proved to have relatively low runoff. Runoff in 1986 was more "normal". This factor must be taken into account when observing the water quality information provided. The program was started to sample from reservoirs contained in each of southwest Saskatchewan's four main drainage basins (Fig. 1): (1) South Saskatchewan River Basin (Swift Current Creek is part of this); (2) Cypress Hills North (water drains into dead end lakes north of #1 Highway); (3) Old Wives Lake; and (4) Missouri Basin (Frenchman, Battle and Lodge creeks are examples). Water samples were collected an average of four times per location in 1985 and five times in 1986.

New water quality guidelines are based upon Electrical Conductivity (EC) and adjusted RNa (Fig. 2). The value of adjusted sodium adsorption ratio (Adj. RNa) is derived from detailed water analysis through calculation. It takes into account the bicarbonate content of the water and results in a value 10 to 20% higher than the SAR. Irrigation with waters high in sodium result in breakdown or dispersion of soil structure. This leads to surface sealing and crusting and difficulty in establishment of crops. The permeability of the soil may also be reduced resulting in runoff.

The discussion of the water quality analysis can be conducted roughly by drainage basin for both years.

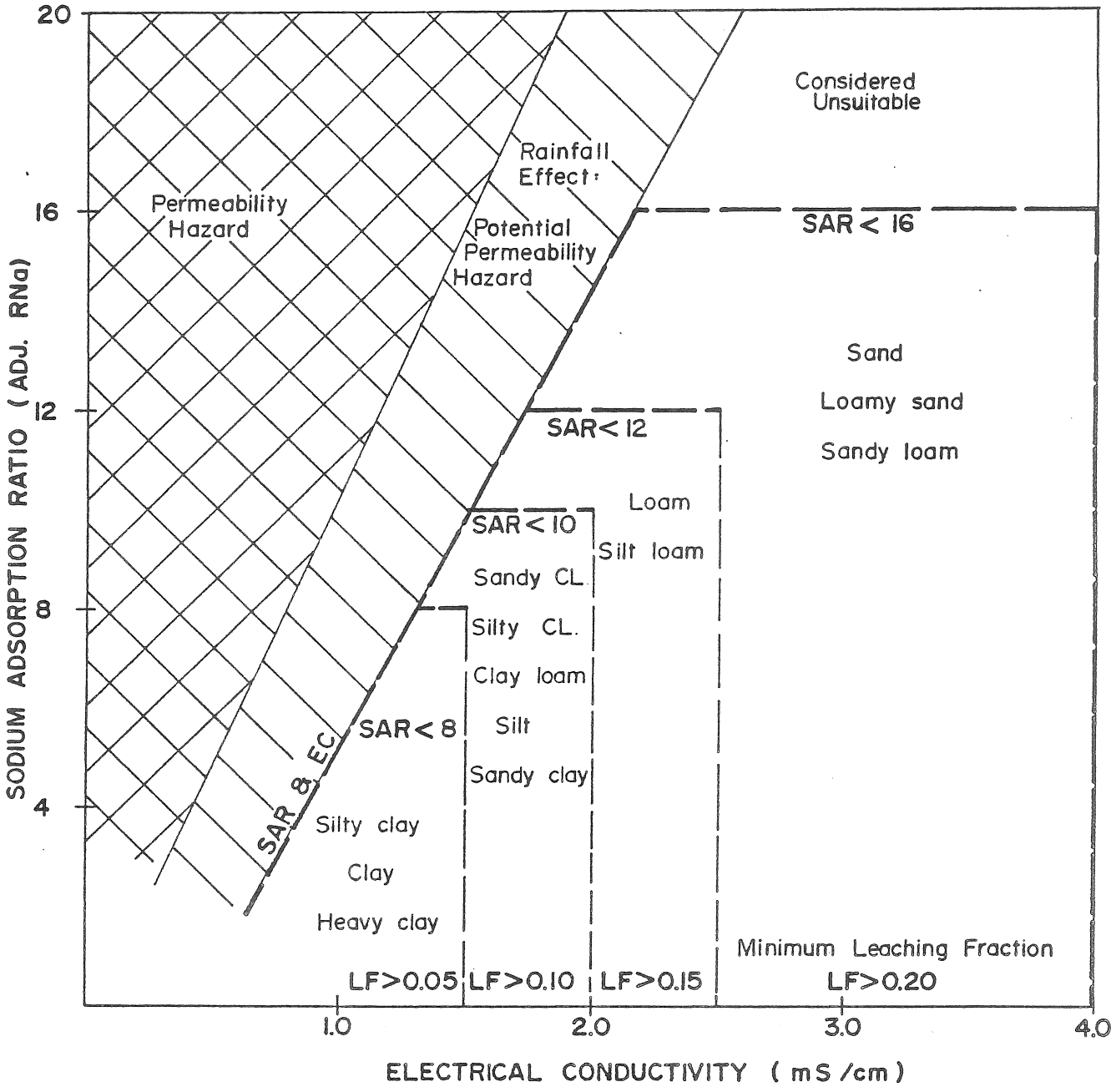


Figure 2 Salinity-SAR guidelines for irrigation water applied to general soil textural categories in Saskatchewan.

1. The South Saskatchewan River Basin generally has water quality that is good to excellent for irrigation. Duncairn, the major reservoir in this basin, contains water which is of excellent quality.

2. The Cypress Hills North Drainage Basin. Reservoirs in this basin generally are good for irrigation and follow a predictable decline in quality throughout the year. One, the Junction Reservoir, which receives drainage water from the 3200 acre Maple Creek project is somewhat poorer than the others but still of good quality and little concern.

3. The Missouri Basin. Water qualities of reservoirs in this basin are also of good quality.

4. Old Wives Lake Drainage Basin. Unfortunately in this basin we have at least one reservoir which is of major concern. The water quality initially in the Cadillac Reservoir (Fig. 3) is of marginal quality for irrigation and undergoes a rapid deterioration during the course of the irrigation season. Based on the current soil water quality compatability guidelines the water would be unfit for irrigation.

The findings of the poor water quality in the Cadillac Reservoir made us initiate a salinity monitoring study of adjacent irrigated lands. Detailed analysis were performed on samples from both irrigated and nonirrigated areas. Results show a rapid increase in sodium content (SAR) in the irrigated area (Table 1). We are currently reviewing the information obtained

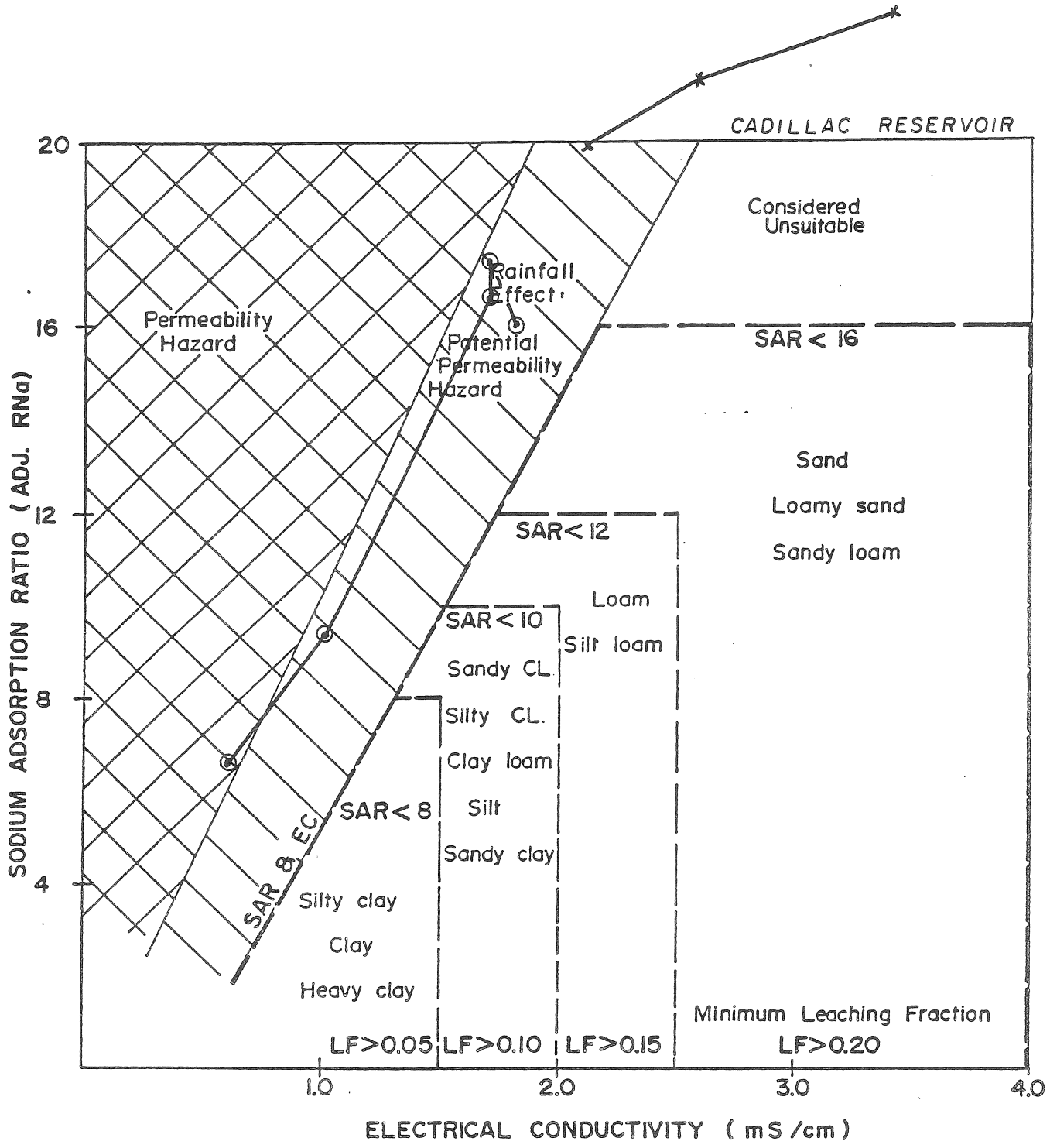


Figure 3. Salinity-SAR guidelines for irrigation water applied to general soil textural categories in Saskatchewan.

CADILLAC RESERVOIR SAMPLING DATA
1985 x—x—x
1986 o—o—o

TABLE 1: CADILLAC RESERVOIR SALINITY MONITORING STUDY 1985-86

SITE #1 - IRRIGATED

1985				1986			
DEPTH (cm)	COND.	TEXTURE	SAR	DEPTH (cm)	COND.	TEXTURE	SAR
0-30	2.0	SL	8.6	0-30	0.8	SL	6.8
30-60	0.8	SL	0.4	30-60	1.7	LS	2.6
60-90	0.3	LS	0.4	60-90	1.5	LS	0.3
90-120	0.3	S	0.4	90-120	0.5	LS	0.3

SITE #2 - IRRIGATED

1985				1986			
DEPTH (cm)	COND.	TEXTURE	SAR	DEPTH (cm)	COND.	TEXTURE	SAR
0-30	2.5	L(S)-SL	9.4	0-30	0.8	L(S)-SL	7.0
30-60	1.1	SL	1.3	30-60	1.0	SL-SCL	2.9
60-90	0.8	SCL	5.1	60-90	1.8	SCL	7.7
90-120	2.0	CL(S)	12.3	90-120	2.3	CL(S)	14.3

SITE #3 - "DRYLAND"

1985			
DEPTH (cm)	COND.	TEXTURE	SAR
0-30	1.3	SL	0.4
30-60	1.0	SL	0.3
60-90	0.7	SL	0.5

NOTE: Nearly 23 cm rain fell in this area prior to fall 1986 sampling

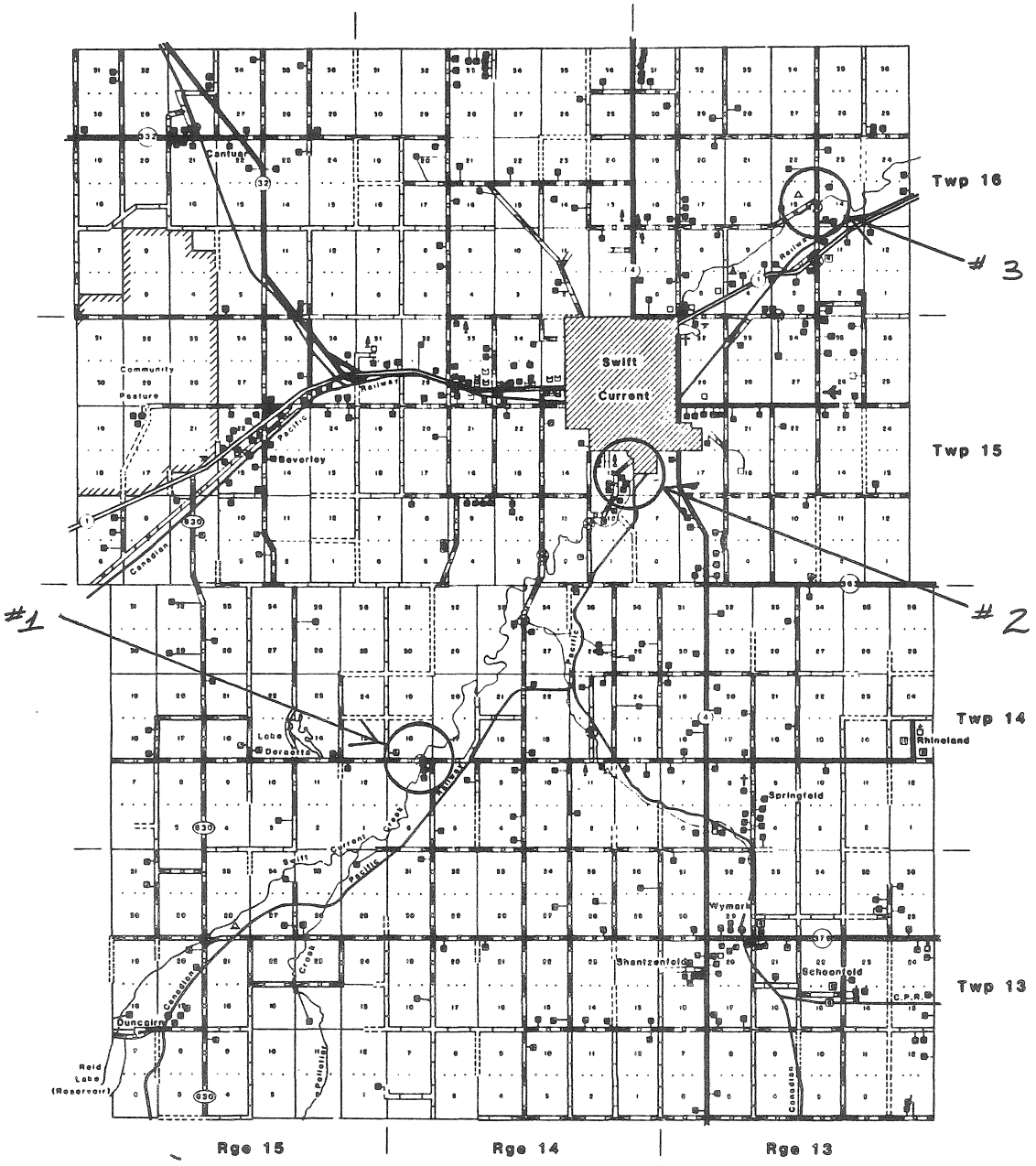
FIGURE 4

Saskatchewan Rural Development

Saskatchewan Inventory 1984

SAMPLING SITE

Rural Municipality No. 137
Swift Current
W. of 3rd M.



Legend

- Divided Provincial Highway
- Provincial Highway
- Bridge
- Paved Surface
- Gravel Surface
- Recort Area
- Regional Park
- Picnic or Campsite
- Recreational or Community Centre
- Airstrip
- Tower
- Gravel Pit
- Grain Terminal
- Colony
- Corral
- Oil Battery
- Compressor Station
- Historical Site
- Trailer Court

Municipal Road System

- Primary Grid Road
- Grid or Main Farm Access Road
- Graded and Drained Road
- Graded and Undrained Road
- Prairie Trail
- Road Allowance-No Access
- Blind Line
- Railways
- Urban Municipality
- Hamlet or Settlement
- Occupied Home
- Part-Time Occupied Home
- Number of Houses
- Business: Store, Garage, Motel, etc.
- Church
- School
- Cemetery
- Industry

Saskatchewan

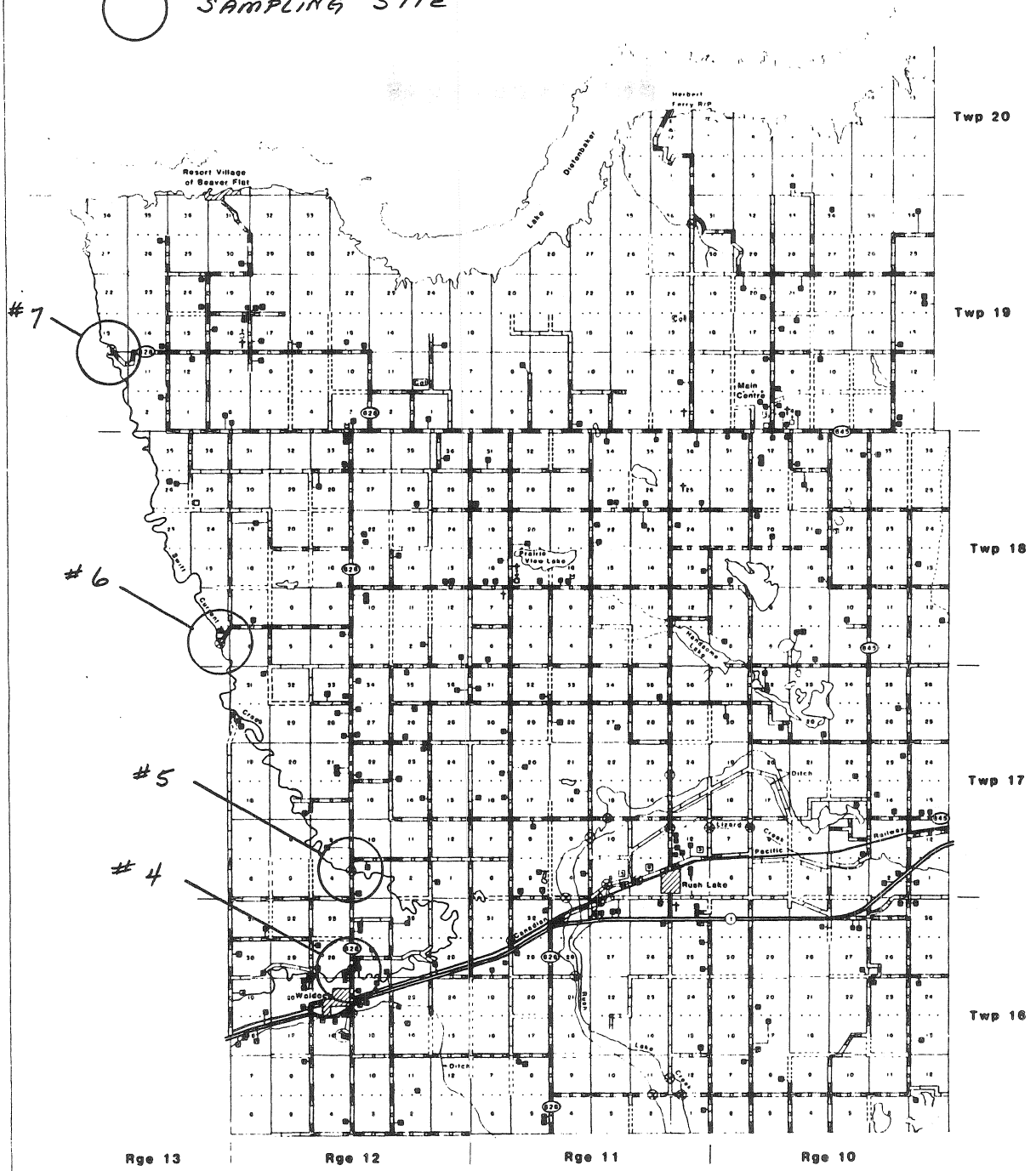
Saskatchewan Rural Development

Saskatchewan Inventory 1984

Rural Municipality No. 166
Excelsior
W. of 3rd M.

FIGURE 5

SAMPLING SITE



Legend

- Divided Provincial Highway
- Provincial Highway
- Bridge
- Paved Surface
- Gravel Surface
- Resort Area
- Regional Park
- Picnic or Campsite
- Recreational or Community Centre
- Airstrip
- Tower
- Gravel Pit
- Grain Terminal
- Colony
- Corral
- Oil Battery
- Compressor Station
- Historical Site
- Trailer Court

Municipal Road System

- Primary Grid Road
- Grid or Main Farm Access Road
- Graded and Drained Road
- Bladed and Undrained Road
- Prairie Trail
- Road Allowance-No Access
- Blind Line
- Railways
- Urban Municipality
- Hamlet or Settlement
- Occupied Home
- Part-Time Occupied Home
- Number of Houses
- Business Store Garage Motel etc
- Church
- School
- Cemetery
- Industry

Saskatchewan

TABLE 2: SWIFT CURRENT CREEK WATER SAMPLING ANALYSIS - 1986

SITE #	SAMPLE DATE	TDS	COND. mS/cm	SAR
1	86/06/19	390	0.6	1.2
2	86/06/19	390	0.6	1.3
3	86/06/19	461	0.7	1.5
4	86/06/19	550	0.9	1.9
5	86/06/19	736	1.1	2.6
6	86/07/30	595	0.9	2.4
7	86/07/30	685	1.1	3.3

REFER TO FIGURE 4 AND 5 FOR SITE LOCATIONS

TABLE 3: DRYLAND AND IRRIGATION SOIL ANALYSIS WITH POOR QUALITY WATER

	DEPTH (cm)	COND. mS/cm	SAR
NON-IRRIGATED DRYLAND	0-15	0.3	0.3
	15-30	0.2	0.4
	30-60	0.3	1.9
IRRIGATED AREA	0-15	4.9	39.5
	15-30	8.3	28.4
	30-45	6.5	10.8
	45-60	3.1	3.6
	60-90	2.7	5.4

IRRIGATION WATER ANALYSIS JULY 1986

COND. 2.2 mS/cm SAR 17.4

to date on water qualities in the southwest. We are also working with Sask Water to determine what would be the best course of action for the utilization of water in the Cadillac Reservoir.

This past summer water qualities were also obtained along the length of the Swift Current Creek (Fig. 4 and 5) . A majority of the water in this creek comes from releases out of the Duncairn Reservoir. Water quality has always been assumed to be good. Analysis of various sites show a degradation in quality along the length of the stream (Table 2).

We also had a look at a private project in which water quality was assumed to be good and in the order of a short four years of irrigation has taken a piece of mellow productive soil and turned it into a virtual desert (Table 3). Samples of the soil are currently being analysed and tests are being conducted to determine what method of corrective action can be taken.

Summary

It has been concluded from the sampling to date that one must look at irrigation water quality not only at one specific time period during the year. It would be suggested to monitor the quality throughout at least one irrigation season and for better

results to monitor over a period of years. If one is limited to a single point sampling the sample would best be obtained during the mid to late irrigation season. Generally, water quality of spring runoff is good. The water does degrade though, depending upon the location and nature of the area in which it is impounded. We feel there are certain water courses in the southwest that are of concern. The nature of the reservoir bed (the amount of salinity in the immediate area) and the groundwater influx into the proposed reservoir site must be investigated prior to development. A detailed hydrogeologic investigation should be conducted as part of the preliminary investigations for irrigation development.

References

Cameron, D.R., Weiterman, G.A. 1986. Irrigation Water Quality-Soil Compatibility - Guidelines for Saskatchewan. In Proc. Soils and Crops Workshop, University of Saskatchewan, Saskatoon, p. 225-238.

PFRA, 1982. History of Irrigation in Western Canada. Prepared by the Prairie Farm Rehabilitation Administration, p. 41-55.

DG6/L

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR ADAMS LAKE RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/24	85/07/11	218	8.1	0.3	7	44	21	8	2	12	---	0.2	0.3	2.2	1.7	0.2	0.1	0.2	---	4.4	0.3	2.7
85/08/07	85/08/30	198	7.8	0.3	7	21	21	6	5	12	178	0.3	0.3	1.1	1.7	0.2	0.1	0.2	2.9	3.3	3.3	2.8
86/03/19	86/04/21	262	8.0	0.4	5	56	22	3	2	14	270	0.1	0.2	2.8	1.8	0.1	0.1	0.3	4.4	4.9	4.8	3.8

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR ADMIRAL RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/05/21	85/05/21	448																				
85/06/25	85/07/11	531	7.8	0.8	150	28	14	16	5	190	---	5.8	6.5	1.4	1.2	0.4	0.1	4.0	---	9.5	4.1	7.8
85/08/08	85/08/30	730	8.5	1.1	193	32	18	18	8	220	428	6.8	8.4	1.6	1.5	0.5	0.2	4.6	7.0	11.9	11.8	11.5
86/03/11	86/03/24	230	7.6	0.4	47	19	8	11	4	64	145	2.3	2.0	0.9	0.6	0.3	0.1	1.3	2.4	3.9	3.8	3.3
86/05/15	86/06/16	390	7.9	0.6	94	24	13	10	3	113	249	3.8	4.1	1.2	1.1	0.3	0.1	2.3	4.1	6.6	6.5	5.8
86/06/24	86/08/06	563	7.2	0.9	151	26	14	14	5	180	343	5.9	6.6	1.3	1.2	0.4	0.1	3.7	5.6	9.4	9.5	8.7
86/07/29	86/08/08	627	8.0	1.0	166	27	14	14	13	200	398	6.5	7.2	1.4	1.1	0.4	0.4	4.2	6.5	10.1	11.1	9.8
86/08/27	86/09/09	704	8.3	1.1	168	33	15	16	5	179	431	6.1	7.3	1.6	1.3	0.4	0.1	3.7	7.1	10.6	10.9	11.1

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR ALTAWAN RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/24	85/07/11	358	7.7	0.6	39	56	22	10	4	150	---	1.1	1.7	2.8	1.8	0.3	0.1	3.1	---	6.6	3.2	5.7
85/08/07	85/08/30	685	9.0	1.1	97	60	48	11	10	400	72	2.3	4.2	3.0	3.9	0.3	0.3	8.3	1.2	11.4	9.8	10.8
86/03/19	86/04/21	115	6.9	0.2	20	15	8	6	3	38	59	1.0	0.9	0.7	0.7	0.2	0.1	0.8	1.0	2.5	1.8	1.6
86/05/02	86/06/16	186	7.5	0.3	25	24	12	8	2	66	106	1.0	1.1	1.2	1.0	0.2	0.1	1.4	1.7	3.5	3.2	2.6
86/06/05	86/07/07	288	8.2	0.4	35	37	20	8	8	101	145	1.1	1.5	1.9	1.7	0.2	0.2	2.1	2.4	5.2	4.7	4.2
86/06/27	86/08/06	307	6.8	0.5	37	36	17	10	4	110	154	1.3	1.6	1.8	1.4	0.3	0.1	2.3	2.5	5.0	4.9	4.5
86/07/28	86/08/08	346	7.2	0.5	35	35	16	8	5	115	195	1.2	1.5	1.8	1.3	0.2	0.1	2.4	3.2	4.8	5.7	5.1
86/08/26	86/09/09	320	7.6	0.5	38	43	19	9	3	103	181	1.2	1.7	2.1	1.6	0.2	0.1	2.1	3.0	5.6	5.2	4.7

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR BRADDOCK RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/27	85/07/25	326	7.9	0.5	34	48	22	13	4	100	---	1.0	1.5	2.4	1.8	0.3	0.1	2.1	---	6.0	2.2	4.7
85/08/14	85/08/30	390	7.8	0.6	34	52	26	13	8	107	241	1.0	1.5	2.6	2.2	0.3	0.2	2.2	3.9	6.6	6.4	5.8
86/03/12	86/03/24	179	7.2	0.3	15	25	11	9	3	50	108	0.6	0.7	1.2	0.9	0.2	0.1	1.0	1.8	3.0	2.9	2.5
86/05/15	86/06/16	230	8.0	0.4	20	32	16	10	3	64	154	0.7	0.9	1.6	1.3	0.3	0.1	1.3	2.5	4.1	3.9	3.3
86/06/24	86/08/06	288	7.3	0.4	31	35	18	11	4	76	187	1.1	1.3	1.7	1.5	0.3	0.1	1.6	3.1	4.9	4.8	4.2
86/07/29	86/08/08	301	7.7	0.5	29	36	17	10	2	77	209	1.0	1.3	1.8	1.4	0.3	0.1	1.6	3.4	4.7	5.1	4.4
86/08/27	86/09/09	320	7.5	0.5	30	37	19	12	4	64	211	1.0	1.3	1.8	1.6	0.3	0.1	1.3	3.5	5.0	4.9	4.7

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR CADILLAC RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/05/06	85/05/10	1331	8.3	2.1	430	19	18	14	14	650	---	17.0	18.7	0.9	1.5	0.4	0.4	13.5	---	21.5	13.9	22.4
85/06/25	85/07/11	1638	8.2	2.6	570	31	26	22	12	800	---	18.3	24.8	1.5	2.1	0.6	0.3	16.7	---	29.0	17.0	28.3
85/08/08	85/08/30	2170	8.6	3.4	680	37	33	24	19	1040	919	19.6	29.6	1.8	2.7	0.6	0.5	21.7	15.1	34.7	37.3	37.7
86/03/18	86/04/21	403	7.8	0.6	105	13	8	8	4	140	203	5.6	4.6	0.6	0.7	0.2	0.1	2.9	3.3	6.1	6.4	6.1
86/05/15	86/06/16	646	7.9	1.0	188	20	13	12	5	255	309	8.0	8.2	1.0	1.1	0.3	0.1	5.3	5.1	10.6	10.5	10.1
86/06/24	86/08/06	1062	7.8	1.7	360	24	15	14	8	440	510	14.2	15.7	1.2	1.3	0.4	0.2	9.2	8.4	18.5	17.7	17.3
86/07/29	86/08/08	1075	8.1	1.7	355	21	14	14	9	440	550	14.8	15.4	1.1	1.1	0.4	0.3	9.2	9.0	18.0	18.4	17.6
86/08/27	86/09/09	1152	8.6	1.8	350	25	15	16	11	495	556	13.7	15.2	1.3	1.2	0.4	0.3	10.3	9.1	18.1	19.7	18.9

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR CYPRESS LAKE RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/08/07	85/08/30	685	7.8	1.1	121	28	60	20	12	220	418	3.0	5.3	1.4	4.9	0.5	0.3	4.6	6.9	12.1	11.8	10.8
86/03/19	86/04/21	525	7.5	0.8	62	56	36	12	6	300	166	1.6	2.7	2.8	2.9	0.3	0.2	6.2	2.7	8.7	9.1	8.1
86/05/02	86/06/16	563	7.4	0.9	84	49	46	13	6	107	461	2.1	3.7	2.4	3.8	0.3	0.2	2.2	7.6	10.2	10.0	8.7
86/06/05	86/07/07	538	7.9	0.8	80	41	51	15	11	155	359	2.0	3.5	2.1	4.2	0.4	0.3	3.2	5.9	10.1	9.4	8.3
86/06/27	86/08/06	589	7.4	0.9	85	33	49	17	7	155	520	2.2	3.7	1.6	4.0	0.4	0.2	3.2	8.5	9.8	11.9	9.1
86/07/28	86/08/08	531	8.6	0.8	75	36	43	13	5	170	337	2.0	3.3	1.8	3.5	0.3	0.1	3.5	5.5	8.9	9.2	8.2
86/08/26	86/09/09	640	7.3	1.0	82	39	51	20	10	175	426	2.0	3.6	1.9	4.2	0.5	0.3	3.6	7.0	10.2	10.9	10.0

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR DOWNIE LAKE RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/24	85/07/11	333	7.7	0.5	49	44	18	12	4	109	---	1.6	2.1	2.2	1.5	0.3	0.1	2.3	---	6.1	2.4	4.7
85/08/07	85/08/30	403	7.8	0.6	53	44	21	12	6	115	258	1.6	2.3	2.2	1.7	0.3	0.2	2.4	4.2	6.5	6.8	6.1
86/03/19	86/04/21	467	7.6	0.7	77	52	24	6	3	150	292	2.2	3.3	2.6	2.0	0.2	0.1	3.1	4.8	8.1	8.0	7.1
86/05/02	86/06/16	288	8.0	0.4	42	31	18	6	13	84	185	1.5	1.8	1.6	1.5	0.2	0.4	1.8	3.0	5.0	5.2	4.2
86/06/05	86/07/07	346	7.5	0.5	51	39	19	9	7	93	223	1.7	2.2	2.0	1.6	0.2	0.2	1.9	3.7	6.0	5.8	5.1
86/06/27	86/08/06	365	7.2	0.6	53	38	22	10	4	105	228	1.7	2.3	1.9	1.8	0.3	0.1	2.2	3.7	6.3	6.0	5.4
86/07/28	86/08/08	365	7.9	0.6	50	37	17	8	2	120	232	1.7	2.2	1.9	1.4	0.2	0.1	2.5	3.8	5.7	6.4	5.4
86/08/26	86/09/09	384	8.3	0.6	52	43	20	11	3	106	248	1.6	2.3	2.1	1.7	0.3	0.1	2.2	4.1	6.4	6.4	5.7

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR DUNCAIRN RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/03/20	85/03/20	141	---	---	--	--	--	--	-	---	---	---	---	---	---	---	---	---	---	---	---	---
85/06/27	85/07/25	397	8.0	0.6	46	56	26	10	4	150	---	1.3	2.0	2.8	2.1	0.3	0.1	3.1	---	7.2	3.2	5.7
85/08/14	85/08/30	429	8.5	0.7	43	56	29	9	6	130	235	1.2	1.9	2.8	2.4	0.2	0.2	2.7	3.9	7.3	6.7	6.5
86/03/11	86/03/24	109	7.1	0.2	5	23	5	9	1	8	106	0.2	0.2	1.1	0.4	0.2	0.0	0.2	1.7	2.0	1.9	1.5
86/05/16	86/06/16	365	7.6	0.6	40	47	28	8	3	114	222	1.1	1.7	2.3	2.3	0.2	0.1	2.4	3.6	6.6	6.1	5.4
86/06/24	86/08/06	422	7.3	0.7	44	49	26	10	4	120	293	1.3	1.9	2.4	2.1	0.3	0.1	2.5	4.8	6.7	7.4	6.4
86/07/29	86/08/08	397	7.6	0.6	42	46	24	8	1	135	246	1.3	1.8	2.3	2.0	0.2	0.0	2.8	4.0	6.3	6.9	5.9
86/08/27	86/09/09	448	7.8	0.7	42	55	26	10	4	120	239	1.2	1.8	2.7	2.2	0.3	0.1	2.5	3.9	7.0	6.5	6.8

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR EASTEND RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/25	85/07/11	301	7.9	0.5	35	35	30	7	8	71	---	1.0	1.5	1.7	2.5	0.2	0.1	1.5	---	5.9	1.6	4.7
85/08/07	85/08/30	262	9.8	0.4	34	15	25	3	5	61	84	1.2	1.5	0.8	2.1	0.1	0.1	1.3	1.4	4.4	2.8	3.8
86/03/19	86/04/21	192	7.9	0.3	19	32	14	4	2	27	168	0.7	0.8	1.6	1.2	0.1	0.1	0.6	2.8	3.7	3.4	2.7
86/05/02	86/06/16	282	8.0	0.4	20	47	23	7	3	37	259	0.6	0.9	2.3	1.9	0.2	0.1	0.8	4.2	5.3	5.1	4.1
86/06/05	86/07/07	294	8.0	0.5	24	44	27	5	8	26	267	0.7	1.0	2.2	2.2	0.1	0.2	0.5	4.4	5.6	5.1	4.3
86/06/27	86/08/06	275	7.5	0.4	30	24	27	5	3	46	250	1.0	1.3	1.2	2.2	0.1	0.1	0.9	4.1	4.8	5.1	4.0
86/07/28	86/08/08	243	8.5	0.4	28	19	24	3	1	41	204	1.0	1.2	0.9	1.9	0.1	0.0	0.9	3.3	4.2	4.2	3.5
86/08/26	86/09/09	256	9.3	0.4	30	17	21	5	3	40	118	1.2	1.3	0.9	1.7	0.1	0.1	0.8	1.9	4.0	2.8	3.7

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR GOUVERNEUR RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/05/06	85/05/10	1069	8.3	1.7	290	50	34	17	13	550	---	7.8	12.6	2.5	2.8	0.4	0.4	11.5	---	18.3	11.8	17.8
85/06/18	85/07/11	1280	8.8	2.0	380	64	52	22	13	710	---	8.6	16.5	3.2	4.3	0.6	0.4	14.8	---	24.6	15.1	21.2
85/08/08	85/08/30	1517	8.8	2.4	400	56	52	22	19	740	440	9.3	17.4	2.8	4.3	0.6	0.5	15.4	7.2	25.0	23.2	25.5
86/03/11	86/03/24	230	7.5	0.4	47	18	8	10	3	95	110	2.3	2.0	0.9	0.6	0.3	0.1	2.0	1.8	3.8	3.9	3.3
86/05/15	86/06/16	448	7.8	0.7	102	26	14	12	4	177	204	4.0	4.4	1.3	1.2	0.3	0.1	3.7	3.3	7.2	7.1	6.8
86/06/24	86/08/06	595	7.4	0.9	142	28	17	14	6	245	292	5.2	6.2	1.4	1.4	0.4	0.2	5.1	4.8	9.3	10.1	9.2
86/07/29	86/08/08	685	7.2	1.1	155	30	17	16	11	250	360	5.6	6.7	1.5	1.4	0.4	0.3	5.2	5.9	10.0	11.4	10.8
86/08/27	86/09/09	704	8.3	1.1	159	37	18	15	8	266	334	5.3	6.9	1.9	1.5	0.4	0.2	5.5	5.5	10.6	11.2	11.1

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR HARRIS RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/24	85/07/11	371	7.9	0.6	47	48	26	13	5	133	---	1.4	2.0	2.4	2.1	0.3	0.1	2.8	---	6.9	2.9	5.7
85/08/07	85/08/30	384	8.1	0.6	49	32	26	10	8	126	190	1.6	2.1	1.6	2.2	0.3	0.2	2.6	3.1	6.2	6.0	5.7
86/03/19	86/04/21	320	7.5	0.5	35	38	20	8	5	97	189	1.1	1.5	1.9	1.6	0.2	0.1	2.0	3.1	5.2	5.3	4.7
86/05/02	86/06/16	358	8.4	0.6	44	43	26	10	6	117	206	1.3	1.9	2.2	2.1	0.3	0.2	2.4	3.4	6.5	6.0	5.3
86/06/05	86/07/07	384	7.3	0.6	45	50	25	9	13	116	235	1.3	2.0	2.5	2.1	0.2	0.4	2.4	3.9	6.7	6.6	5.7
86/06/27	86/08/06	397	7.5	0.6	45	46	27	10	6	130	234	1.3	2.0	2.3	2.2	0.3	0.2	2.7	3.8	6.7	6.7	5.9
86/07/28	86/08/08	346	7.8	0.5	44	24	23	8	4	140	172	1.5	1.9	1.2	1.9	0.2	0.1	2.9	2.8	5.2	5.8	5.1
86/08/26	86/09/09	384	7.7	0.6	46	30	26	11	6	122	167	1.5	2.0	1.5	2.1	0.3	0.2	2.5	2.7	5.9	5.4	5.7

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR HERBERT RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/20	85/06/20	448	---	---	--	--	--	--	--	---	---	---	---	---	---	---	---	---	---	---	---	---
85/08/06	85/08/30	442	8.5	0.7	62	25	32	13	10	17	166	1.9	2.7	1.3	2.7	0.3	0.3	0.4	2.7	7.0	3.4	6.7
86/03/11	86/03/24	186	7.4	0.3	28	18	9	9	2	56	120	1.3	1.2	0.9	0.8	0.2	0.1	1.2	2.0	3.1	3.2	2.6
86/03/13	86/03/24	314	7.3	0.5	38	32	21	14	5	128	193	1.3	1.7	1.6	1.7	0.4	0.1	2.7	3.2	5.3	6.0	4.6
86/05/20	86/06/16	429	7.7	0.7	57	41	34	12	4	157	227	1.6	2.5	2.1	2.8	0.3	0.1	3.3	3.7	7.6	7.1	6.5
86/06/26	86/08/06	403	8.0	0.6	53	32	29	13	4	150	211	1.6	2.3	1.6	2.4	0.3	0.1	3.1	3.5	6.6	6.7	6.1
86/07/30	86/08/08	390	8.6	0.6	51	32	26	10	3	160	184	1.6	2.2	1.6	2.2	0.3	0.1	3.3	3.0	6.2	6.4	5.8
86/08/28	86/09/09	384	8.9	0.6	51	32	29	13	4	142	167	1.6	2.2	1.6	2.4	0.3	0.1	3.0	2.7	6.5	5.8	5.7

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR HIGHFIELD RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/20	85/06/20	454	---	---	--	--	--	--	-	---	---	---	---	---	---	---	---	---	---	---	---	---
85/08/06	85/08/30	416	8.7	0.6	54	34	29	11	7	149	157	1.6	2.3	1.7	2.4	0.3	0.2	3.1	2.6	6.7	5.9	6.3
86/03/13	86/03/24	192	7.3	0.3	22	23	11	10	3	72	100	0.9	1.0	1.1	0.9	0.3	0.1	1.5	1.6	3.3	3.2	2.7
86/05/20	86/06/16	384	7.3	0.6	47	41	28	12	4	140	189	1.4	2.0	2.1	2.3	0.3	0.1	2.9	3.1	6.7	6.1	5.7
86/06/26	86/07/07	390	8.2	0.6	45	51	28	9	9	119	245	1.3	2.0	2.5	2.3	0.2	0.2	2.5	4.0	7.0	6.7	5.8
86/07/30	86/08/06	384	8.5	0.6	48	33	29	10	3	160	167	1.5	2.1	1.6	2.4	0.3	0.1	3.3	2.7	6.4	6.2	5.7
86/08/28	86/09/09	384	9.5	0.6	54	30	25	11	8	145	102	1.7	2.3	1.5	2.1	0.3	0.2	3.0	1.7	6.2	4.9	5.7

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR JUNCTION RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/24	85/07/11	870	8.1	1.4	150	76	68	17	16	480	---	3.0	6.5	3.8	5.6	0.4	0.5	10.0	---	16.3	10.4	14.4
85/08/07	85/08/30	973	8.1	1.5	164	76	72	15	20	480	362	3.2	7.1	3.8	5.9	0.4	0.6	10.0	5.9	17.2	16.5	15.8
86/03/19	86/04/21	570	7.6	0.9	89	52	64	10	12	300	218	2.0	3.9	2.6	5.3	0.3	0.3	6.2	3.6	12.0	10.2	8.8
86/05/02	86/06/16	883	8.0	1.4	150	74	68	14	20	483	314	3.0	6.5	3.7	5.6	0.4	0.6	10.1	5.1	16.2	15.8	14.2
86/06/05	86/07/07	915	7.7	1.4	158	74	70	14	25	544	318	3.2	6.9	3.7	5.8	0.4	0.7	11.3	5.2	16.7	17.2	14.8
86/06/27	86/08/06	890	7.4	1.4	152	61	67	15	20	420	304	3.2	6.6	3.0	5.5	0.4	0.6	8.7	5.0	15.5	14.3	14.3
86/07/28	86/08/08	819	8.9	1.3	140	53	56	11	16	460	234	3.2	6.1	2.7	4.6	0.3	0.5	9.6	3.8	13.6	13.9	13.1
86/08/26	86/09/09	832	9.2	1.3	140	59	66	14	16	473	204	3.0	6.1	2.9	5.5	0.4	0.5	9.8	3.3	14.8	13.6	13.3

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR LAC PELLETIER RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/27	85/07/25	442	8.4	0.7	48	58	60	16	7	66	---	1.1	2.1	2.6	4.9	0.4	0.2	1.4	---	10.1	1.6	6.8
85/08/14	85/08/30	467	8.6	0.7	49	20	64	15	10	68	403	1.2	2.1	1.0	5.3	0.4	0.3	1.4	6.6	8.8	8.3	7.1
86/03/11	86/03/24	51	7.2	0.1	5	8	4	3	1	5	54	0.4	0.2	0.4	0.3	0.1	0.0	0.1	0.9	1.0	1.0	0.6
86/05/16	86/06/16	467	8.0	0.7	48	24	64	14	7	72	410	1.2	2.1	1.2	5.3	0.4	0.2	1.5	6.7	8.9	8.4	7.1
86/06/24	86/08/06	474	7.7	0.7	49	24	59	16	8	75	415	1.2	2.1	1.2	4.8	0.4	0.2	1.6	6.8	8.6	8.6	7.2
86/07/29	86/08/08	448	8.5	0.7	47	19	56	14	7	67	402	1.2	2.0	0.9	4.6	0.4	0.2	1.4	6.6	7.9	8.2	6.8
86/08/27	86/09/09	448	8.5	0.7	45	23	70	16	7	57	407	1.1	2.0	1.1	5.8	0.4	0.2	1.2	6.7	9.3	8.1	6.8

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR MIDDLE CREEK RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/24	85/07/11	512	8.2	0.8	60	72	37	22	8	155	---	1.4	2.6	3.6	3.0	0.6	0.2	3.2	---	9.8	3.5	7.8
85/08/07	85/08/30	1370	7.8	2.1	218	128	108	34	36	430	963	3.4	9.5	6.4	8.9	0.9	1.0	9.0	15.8	25.6	25.8	22.9
86/03/19	86/04/21	166	6.9	0.3	9	31	10	9	3	12	174	0.4	0.4	1.5	0.8	0.2	0.1	0.2	2.9	3.0	3.2	2.3
86/05/02	86/06/16	154	7.4	0.2	17	23	12	11	3	20	131	0.7	0.7	1.1	0.9	0.3	0.1	0.4	2.1	3.1	2.6	2.1
86/06/05	86/07/07	211	7.7	0.3	20	29	13	12	7	15	180	0.8	0.9	1.5	1.1	0.3	0.2	0.3	3.0	3.7	3.5	3.0
86/06/27	86/08/06	243	7.0	0.4	28	32	14	14	5	23	202	1.0	1.2	1.6	1.2	0.4	0.1	0.5	3.3	4.3	3.9	3.5
86/07/28	86/08/08	269	7.7	0.4	25	34	15	13	4	30	245	0.9	1.1	1.7	1.3	0.3	0.1	0.6	4.0	4.4	4.8	3.9
86/08/26	86/09/09	320	7.7	0.5	29	55	19	17	5	33	288	0.9	1.3	2.7	1.6	0.4	0.1	0.7	4.7	6.0	5.5	4.7

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR McDOUGALD RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/20	85/07/11	262	8.1	0.4	24	44	19	10	3	60	---	0.8	1.0	2.2	1.6	0.3	0.1	1.2	---	5.1	1.3	3.7
85/08/07	85/08/30	294	8.6	0.5	29	32	20	9	5	89	162	1.0	1.3	1.6	1.6	0.2	0.1	1.9	2.7	4.7	4.6	4.3
86/03/19	86/04/21	205	7.3	0.3	23	34	16	6	3	40	161	0.8	1.0	1.7	1.3	0.2	0.1	0.8	2.6	4.1	3.6	2.9
86/05/02	86/06/16	314	7.6	0.5	24	49	26	4	2	72	251	0.7	1.0	2.4	2.1	0.1	0.1	1.5	4.1	5.7	5.7	4.6
86/06/05	86/07/07	301	7.8	0.5	25	50	24	7	7	39	259	0.7	1.1	2.5	2.0	0.2	0.2	0.8	4.2	5.7	5.3	4.4
86/06/27	86/08/06	314	7.9	0.5	23	46	22	7	2	47	267	0.7	1.0	2.3	1.8	0.2	0.1	1.0	4.4	5.3	5.4	4.6
86/07/28	86/08/08	378	7.8	0.6	36	36	30	6	2	160	215	1.1	1.6	1.8	2.4	0.2	0.1	3.3	3.5	5.9	6.9	5.6
86/08/26	86/09/09	512	7.8	0.8	43	59	43	10	3	181	249	1.0	1.9	2.9	3.5	0.3	0.1	3.8	4.1	8.6	7.9	7.8

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR NASHLYN RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/24	85/07/11	1824	8.7	2.8	380	84	208	31	32	1330	---	5.1	16.5	4.2	17.1	0.8	0.9	27.7	---	38.6	28.6	30.6
86/03/19	86/04/21	275	7.1	0.4	31	35	17	14	5	93	151	1.1	1.3	1.7	1.4	0.4	0.1	1.9	2.5	4.8	4.6	4.0
86/05/02	86/06/16	474	7.8	0.7	45	62	36	11	5	194	240	1.1	2.0	3.1	3.0	0.3	0.1	4.0	3.9	8.3	8.1	7.2
86/06/05	86/07/07	563	7.9	0.9	68	53	57	17	11	278	237	1.5	3.0	2.6	4.7	0.4	0.3	5.8	3.9	10.7	10.0	8.7
86/06/27	86/08/06	602	9.1	0.9	87	45	44	16	7	375	123	2.2	3.8	2.3	3.6	0.4	0.2	7.8	2.0	10.0	10.0	9.3
86/07/28	86/08/08	698	8.9	1.1	110	53	43	16	8	480	91	2.7	4.8	2.7	3.5	0.4	0.2	10.0	1.5	11.4	11.7	11.0
86/08/26	86/09/09	1920	7.4	3.0	238	187	187	37	21	1340	321	2.9	10.4	9.3	15.4	0.9	0.6	27.9	5.3	36.0	33.8	33.0

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR RUSSELL CREEK RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/27	85/07/25	262	7.7	0.4	21	44	19	11	4	74	---	0.7	0.9	2.2	1.6	0.3	0.1	1.5	---	5.0	1.7	3.7
85/08/14	85/08/30	365	8.0	0.6	19	60	28	11	6	106	239	0.5	0.8	3.0	2.3	0.3	0.2	2.2	3.9	6.4	6.3	5.4
86/03/12	86/03/24	102	7.2	0.2	8	16	6	8	2	22	73	0.4	0.3	0.8	0.5	0.2	0.1	0.5	1.2	1.8	1.7	1.4
86/05/15	86/06/16	198	7.3	0.3	17	27	17	8	3	49	138	0.6	0.7	1.4	1.4	0.2	0.1	1.0	2.3	3.7	3.4	2.8
86/06/24	86/08/06	256	7.1	0.4	21	35	18	9	5	57	179	0.7	0.9	1.7	1.5	0.2	0.1	1.2	2.9	4.4	4.3	3.7
86/07/29	86/08/08	269	7.2	0.4	19	22	17	9	6	63	181	0.7	0.8	1.1	1.4	0.2	0.2	1.3	3.0	3.5	4.4	3.9
86/08/27	86/09/09	256	7.7	0.4	21	39	19	10	4	54	189	0.7	0.9	1.9	1.6	0.3	0.1	1.1	3.1	4.7	4.3	3.7

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR SAUDER RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/20	85/06/20	576	---	---	--	--	--	--	-	---	---	---	---	---	---	---	---	---	---	---	---	---
85/08/06	85/08/30	486	9.3	0.8	83	33	27	15	7	180	117	2.6	3.6	1.6	2.2	0.4	0.2	3.7	1.9	7.9	5.9	7.4
86/03/13	86/03/24	211	7.4	0.3	27	23	12	9	2	91	106	1.1	1.2	1.1	1.0	0.2	0.1	1.9	1.7	3.5	3.7	3.0
86/05/20	86/06/16	486	7.6	0.8	85	40	33	12	4	216	218	2.4	3.7	2.0	2.7	0.3	0.1	4.5	3.6	8.7	8.2	7.4
86/06/26	86/08/06	518	7.6	0.8	88	33	32	15	3	240	221	2.6	3.8	1.6	2.6	0.4	0.1	5.0	3.6	8.5	8.7	8.0
86/07/30	86/08/08	486	9.6	0.8	85	30	25	12	2	230	104	2.8	3.7	1.5	2.1	0.3	0.1	4.8	1.7	7.6	6.5	7.4
86/08/28	86/09/09	512	9.6	0.8	92	34	27	14	3	215	116	2.9	4.0	1.7	2.2	0.4	0.1	4.5	1.9	8.2	6.5	7.8

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR SEMEREAU RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/27	85/07/25	224	7.6	0.4	18	40	12	15	2	56	---	0.6	0.8	2.0	1.0	0.4	0.1	1.2	---	4.1	1.2	3.7
85/08/14	85/08/30	179	7.9	0.3	14	16	8	14	4	46	99	0.7	0.6	0.8	0.7	0.4	0.1	1.0	1.6	2.4	2.7	2.5
86/03/18	86/04/21	102	6.9	0.2	16	13	7	12	2	27	71	0.9	0.7	0.6	0.6	0.3	0.1	0.6	1.2	2.2	1.8	1.4
86/05/14	86/06/16	250	7.6	0.4	16	40	18	12	2	39	214	0.5	0.7	2.0	1.5	0.3	0.1	0.8	3.5	4.5	4.4	3.6
86/06/24	86/08/06	160	6.7	0.3	15	21	8	12	1	22	128	0.7	0.7	1.1	0.7	0.3	0.0	0.5	2.1	2.7	2.6	2.2
86/07/29	86/08/08	166	7.1	0.3	10	21	8	10	1	17	142	0.5	0.4	1.0	0.7	0.3	0.0	0.4	2.3	2.4	2.7	2.3
86/08/27	86/09/09	192	7.4	0.3	15	33	10	13	1	17	163	0.6	0.7	1.6	0.8	0.3	0.0	0.4	2.7	3.5	3.1	2.7

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR SHAHEEN RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/20	85/06/20	528	---	---	--	--	--	--	-	---	---	---	---	---	---	---	---	---	---	---	---	---
85/08/06	85/08/30	518	8.8	0.8	50	36	48	21	8	280	118	1.3	2.2	1.8	3.9	0.5	0.2	5.8	1.9	8.5	8.0	8.0
86/03/13	86/03/24	230	7.5	0.4	15	31	16	11	3	128	96	0.5	0.7	1.5	1.3	0.3	0.1	2.7	1.6	3.8	4.3	3.3
86/05/20	86/06/16	486	7.6	0.8	38	56	47	15	5	216	217	0.9	1.7	2.8	3.9	0.4	0.1	4.5	3.6	8.7	8.2	7.4
86/06/26	86/08/06	512	7.9	0.8	46	41	50	20	5	255	203	1.1	2.0	2.0	4.1	0.5	0.1	5.3	3.3	8.7	8.8	7.8
86/07/30	86/08/08	512	7.6	0.8	45	42	51	18	4	265	214	1.1	2.0	2.1	4.2	0.5	0.1	5.5	3.5	8.7	9.1	7.8
86/08/28	86/09/09	576	7.6	0.9	50	55	66	20	5	263	215	1.1	2.2	2.7	5.5	0.5	0.1	5.5	3.5	10.9	9.1	8.9

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR SUMMERCOVE RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L--- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/27	85/07/11	730	8.1	1.1	151	48	44	18	9	340	---	3.8	6.6	2.4	3.6	0.5	0.3	7.1	---	13.0	7.3	11.1
85/08/14	85/08/30	870	7.6	1.4	170	48	44	22	14	350	414	4.3	7.4	2.4	3.6	0.6	0.4	7.3	6.8	14.0	14.5	14.0
86/03/12	86/06/16	634	8.0	1.0	127	42	39	13	7	254	320	3.4	5.5	2.1	3.2	0.3	0.2	5.3	5.2	11.2	10.7	9.9
86/05/14	86/08/06	723	7.9	1.1	144	44	36	15	8	315	362	3.9	6.3	2.2	2.9	0.4	0.2	6.6	5.9	11.8	12.7	11.4
86/07/29	86/08/08	704	9.4	1.1	155	36	39	14	7	310	220	4.3	6.7	1.8	3.2	0.4	0.2	6.5	3.6	12.1	10.3	11.1
86/08/27	86/09/09	768	9.9	1.2	152	36	39	16	8	321	149	4.2	6.6	1.8	3.2	0.4	0.2	6.7	2.4	12.0	9.3	12.2

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR THOMPSON LAKE RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L--- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/27	85/07/25	710	7.8	1.1	146	52	32	15	9	370	---	3.9	6.4	2.6	2.6	0.4	0.3	7.7	---	12.0	8.0	11.1
85/08/14	85/08/30	768	8.5	1.2	157	48	33	15	120	350	251	4.3	6.8	2.4	2.7	0.4	3.4	7.3	4.1	12.3	14.8	12.2
86/03/11	86/04/21	198	7.2	0.3	39	16	10	8	3	75	87	1.9	1.7	0.8	0.9	0.2	0.1	1.6	1.4	3.6	3.1	2.8
86/05/16	86/06/16	352	8.0	0.6	61	35	17	10	5	127	182	2.1	2.7	1.8	1.4	0.3	0.1	2.6	3.0	6.1	5.7	5.2
86/06/24	86/08/06	378	6.9	0.6	67	29	18	12	5	150	170	2.4	2.9	1.5	1.5	0.3	0.1	3.1	2.8	6.2	6.1	5.6
86/07/29	86/08/08	416	7.7	0.6	69	32	17	10	5	170	195	2.5	3.0	1.6	1.4	0.3	0.1	3.5	3.2	6.2	6.9	6.3
86/08/27	86/09/09	448	7.9	0.7	77	36	21	12	5	169	206	2.5	3.3	1.8	1.7	0.3	0.1	3.5	3.4	7.2	7.0	6.8

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR VAL MARIE RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/25	85/07/11	531	8.1	0.8	70	64	40	13	5	250	---	1.7	3.0	3.2	3.3	0.3	0.1	5.2	---	9.9	5.3	1.7
85/08/08	85/08/30	922	7.4	1.4	139	80	76	15	11	490	318	2.7	6.0	4.0	6.3	0.4	0.3	10.2	5.2	16.7	15.7	14.9
86/03/11	86/03/24	154	7.5	0.2	17	21	9	6	2	45	106	0.8	0.7	1.0	0.7	0.2	0.1	0.9	1.7	2.6	2.7	2.1
86/05/02	86/06/16	230	7.8	0.4	26	29	17	8	2	64	156	0.9	1.1	1.5	1.4	0.2	0.1	1.3	2.6	4.2	4.0	3.3
86/06/05	86/07/07	333	7.4	0.5	46	39	23	8	8	93	206	1.4	2.0	2.0	1.9	0.2	0.2	1.9	3.4	6.1	5.5	4.9
86/06/24	86/08/06	397	7.3	0.6	51	41	24	9	3	130	243	1.6	2.2	2.0	2.0	0.2	0.1	2.7	4.0	6.5	6.8	5.9
86/07/29	86/08/08	493	7.0	0.8	58	31	25	11	22	110	335	1.9	2.5	1.6	2.1	0.3	0.6	2.3	5.5	6.4	8.4	7.5
86/08/27	86/09/09	448	7.6	0.7	63	47	29	12	4	155	253	1.8	2.7	2.3	2.4	0.3	0.1	3.2	4.1	7.8	7.5	6.8

SASKATCHEWAN SOIL TESTING LAB
WATER ANALYSIS
FOR WEST VAL MARIE RESERVOIR

SAMPLE DATE	TEST DATE	T D S	pH	COND mS/cm	---CONCENTRATION OF SOLUBLE IONS--------- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	S A R	-----IONS IN SATURATION EXTRACT MEQ/L-- Na+	Ca++	Mg++	K+	Cl-	SO_4	HCO_3	CATIONS meq/L	ANIONS meq/L	SALTS meq/L
85/06/25	85/07/11	672	8.1	1.0	118	60	52	12	6	370	---	2.7	5.1	8.0	4.3	0.3	0.2	7.7	---	12.7	7.9	10.0
85/08/08	85/08/30	941	7.6	1.5	162	92	60	11	10	420	424	3.2	7.0	4.6	4.9	0.3	0.3	8.7	6.9	16.9	16.0	15.2
86/03/11	86/03/24	147	7.6	0.2	15	21	9	6	2	32	112	0.7	0.7	1.0	0.7	0.2	0.1	0.7	1.8	2.6	2.6	2.0
86/05/02	86/06/16	390	7.9	0.6	50	49	29	8	3	123	253	1.4	2.2	2.4	2.4	0.2	0.1	2.6	4.1	7.2	6.8	5.8
86/06/05	86/07/07	442	7.7	0.7	65	49	32	9	8	146	264	1.8	2.8	2.4	2.6	0.2	0.2	3.0	4.3	8.1	7.6	6.7
86/06/24	86/08/06	538	7.7	0.8	83	47	41	9	4	210	288	2.1	3.6	2.4	3.4	0.2	0.1	4.4	4.7	9.6	9.2	8.3
86/07/29	86/08/08	845	8.0	1.3	164	49	51	10	7	460	292	3.9	7.1	2.5	4.2	0.3	0.2	9.6	4.8	14.1	14.6	13.5
86/08/27	86/09/09	960	8.1	1.5	165	55	74	130	8	565	290	3.4	7.2	2.7	6.1	3.3	0.2	11.8	4.8	19.3	16.7	15.5